Actual CAT 2025

Slot – II

hitbullseye

BULLS EYE KNOWLEDGE SYSTEM LIMITED

Answer Key Actual CAT Slot - II

Q. No	Key	Q. No	Key	Q. No	Key
1.	4	25.	4	47.	3
2.	3	26.	2	48.	2
3.	4	27.	4	49.	4
4.	2	28.	2	50.	1
5.	3 (TITA)	29.	4 (TITA)	51.	2
6.	2413 (TITA)	30.	60 (TITA)	52.	340 (TITA)
7.	1	31.	40 (TITA)	53.	1
8.	3 (TITA)	32.	84 (TITA)	54.	3
9.	4	33.	3	55.	1
10.	2	34.	45 (TITA)	56.	80° (TITA)
11.	3	35.	35 (TITA)	57.	4
12.	1	36.	50 (TITA)	58.	2 (TITA)
13.	4	37.	3	59.	49 (TITA)
14.	3	38.	9 (TITA)	60.	2
15.	4	39.	4 (TITA)	61.	12 (TITA)
16.	1423 (TITA)	40.	3	62.	4
17.	4	41.	4	63.	4
18.	2	42.	3 (TITA)	64.	8 (TITA)
19.	4	43.	6 (TITA)	65.	4
20.	1	44.	1	66.	25 (TITA)
21.	2	45.	2	67.	1
22.	1	46.	4	68.	17 (TITA)
23.	2				
24.	2				

Explanation Actual CAT Slot - II

Q. No.	Explanation
1.	Riddle's inference, based on the cross-breeding experiment, is that there is no link between eye presence/absence and the accumulation of carotenoids (which turn fat yellow). This conclusion is supported by the observation that some eyeless cavefish had white fat (low carotenoids), showing that eye loss does not necessarily lead to carotenoid buildup. If the experiment instead showed that only eyeless offspring had yellow fat, this would establish a strict correlation between the absence of eyes and high carotenoid levels. Such a result would directly contradict Riddle's inference that there is no connection, because it would suggest that eye loss is consistently associated with carotenoid accumulation. Therefore, this outcome would invalidate her conclusion. The other options are consistent with Riddle's inference: Options 1 and 2 show that fish with eyes can have either white or yellow fat, indicating no clear link. Option 3 (some eyeless offspring with white fat) is explicitly mentioned in the passage as evidence supporting Riddle's view. Thus, only option 4 would undermine Riddle's inference.
2.	The "apparent inefficiency" refers to the fact that cavefish embryos begin to form eyes, only for the eye cells to die later. According to Riddle, this is unavoidable because the early development of the brain and the eye are completely intertwined—they occur together in all members of the species. Since the basic developmental program is shared with surface fish, the least disruptive evolutionary path to eyelessness is to start the eye-formation process and then abort it, rather than trying to eliminate eye development from the outset. Option 3 correctly identifies this shared early developmental stage as the reason the inefficiency cannot be avoided. Option 1 is incorrect; the passage does not attribute eye-cell death to the lack of light. Option 2 describes a compensation for losing eyes, but does not explain why the inefficient process itself is unavoidable. Option 4 addresses the ecological pressure that favors losing eyes, but not why the developmental process remains inefficient.
3.	The passage explicitly states that Riddle hypothesizes carotenoids "may be another adaptation to suppress inflammation," which is important because cavefish often overeat when food is available, leading to enlarged fat cells that can burst and cause inflammation. This directly supports option 4. Option 1 describes a visible effect (yellow color) but not the functional purpose. Option 2 is considered and rejected by the experiment showing no link between eye loss and carotenoid accumulation. Option 3 is not mentioned; the passage discusses nutrient absorption and storage as separate adaptations, not linked to carotenoids. Thus, based on the passage, the most likely function of carotenoids is to control inflammation.
4.	The question asks which statement does not describe an adaptation in Mexican tetra cavefish. Adaptations are specific traits that have evolved through natural selection to enhance survival in the cave environment. Option 1 describes the cave environment and the fish's diet. While it doesn't name a trait, it describes the selective pressure (scarce food) that drove adaptations like efficient nutrient absorption. It is part of the adaptive narrative. Option 2 is a general biological statement about fat cells and inflammation in humans and other animals. It is used to introduce a common problem, not to describe a specific adaptation of the cavefish. The adaptation is revealed in the next sentence, where the passage states that cavefish have fewer signs of inflammation despite this general risk. Therefore, this quoted line itself is not about cavefish adaptation. Option 3 directly explains the adaptive rationale for losing eyes—maintaining unused "expensive tissues" is a disadvantage in a resource-poor cave. Option 4 describes the cavefish's behavioral and physiological adaptation of overeating and storing fat when food is available, a crucial survival strategy in their feast-or-famine environment. Thus, only Option 2 does not describe an adaptation in the cavefish; it provides a comparative biological context.
5.	Sentences 4, 1, 2, and 5 form a coherent paragraph that introduces the show's format, describes Torres's appearance and delivery style, and details the content of his comedy. Sentence 3, with its evaluative tone and reference to a "colour-scouting mission" that isn't mentioned elsewhere, breaks this descriptive flow and reads like a concluding remark or external review rather than part of the same descriptive sequence.

6.	We need a logical flow. Probably start with introducing the scent of old books (sentence 2). Then sentence 4 can follow, clarifying that it's not dust but chemical changes. Then sentence 1 explains the chemical changes: breakdown of cellulose and lignin releasing compounds. Then sentence 3 lists the specific compounds. So order: 2, 4, 1, 3.
7.	The missing sentence describes Western customers' disbelief in the human origin of Dhaka muslin, attributing it to mythical weavers like mermaids or fairies. This fits best at position 1, immediately after the opening description of the fabric as a "miracle" and "woven air." Placing it here logically extends the sense of wonder and introduces the rumor before the paragraph details the actual, intricate human process involved in creating the muslin. Inserting it later would disrupt the flow of the technical and historical details that follow.
8.	Sentences 1, 2, 4, and 5 form a coherent paragraph focused on the health implications of PFAS exposure and the significance of recent research: Sentence 1 introduces PFAS and their common uses. Sentence 2 presents new research linking PFAS to health problems via changes in gene activity. Sentence 4 extends the research by suggesting it may reveal other unidentified diseases. Sentence 5 discusses the practical importance of the findings for diagnosis and treatment. Sentence 3, while factually correct, shifts the focus to the environmental persistence of PFAS (why they are called “forever chemicals”). This interrupts the logical flow of the paragraph, which is centered on health effects and research outcomes rather than environmental characteristics. Therefore, sentence 3 is the odd one out.
9.	The passage explicitly contrasts astronomy as a “receptive” science, dependent on detecting emissions, with biology’s “interventional” instrumentation, such as gene-splicing. This direct comparison makes option 4 a valid inference from the text. Option 1 is incorrect because the passage attributes the observations of Venus’s phases and Jupiter’s satellites to Galileo, not to Newton’s later improvements. Option 2 is incorrect because the “new astronomy” refers to observations beyond the optical spectrum (e.g., radio astronomy), which postdate Newton’s reflecting telescopes. Option 3 is invalid because the passage does not contrast “interventionist instruments” and “embodied instruments” as separate categories; it presents instrumentation as embodying science, with varying styles (receptive vs. interventional).
10.	The quoted statement emphasizes that modern sciences are “highly instrumentalized” and that progress depends on “constant improvements upon the respective instrumental trajectories.” This directly leads to the conclusion that advances in these fields result from better instruments. The passage illustrates this with astronomy (from Galileo’s telescopes to modern electromagnetic-spectrum telescopes) and biology (from microscopes to interventional biotechnologies), making option 2 a valid inference. Option 1 distorts the idea: the passage speaks of science being “instrumentally embodied,” not of progress being “embodied in trajectories of improvement.” Option 3 introduces “scientific constants,” which are not discussed in the passage and are unrelated to instrument improvement. Option 4 injects a normative notion (“must be respected”) that goes beyond the descriptive claim that progress requires instrument improvement. Thus, only option 2 is a valid conclusion drawn from the given statement.
11.	The passage characterizes scientific instruments as either receptive (detecting/receiving emissions, like telescopes) or interventional (actively manipulating subjects, like gene-splicing tools). Both types are integral to scientific progress. A kitchen oven can be seen as an interventional instrument in food science or chemistry (applying heat to transform materials). A scalpel is a clear example of an interventional instrument in biology or medicine. A saxophone, while primarily a musical instrument, could be used receptively in acoustics research or interveningly in sound-wave experiments. A milestone, however, is neither receptive nor interventional in a scientific sense. It is a marker of distance or achievement, not a tool for observation or manipulation in any scientific discipline. Thus, the passage’s characterizations of instruments are least applicable to a milestone.
12.	At first glance, this might appear to contradict the passage, since mathematics is an ancient discipline with a long intellectual tradition. However, a closer reading shows that the passage’s concept of “scientific culture” is closely tied to instrumental embodiment. The passage argues that different sciences have different “cultures and practices” shaped by their instruments—astronomy’s receptive culture and biology’s interventional culture. It then notes that mathematics “perhaps the last of the scientific disciplines to move into such technical embodiment” and that it “only contemporarily has come to rely more and more upon the computational machinery now in common use.”

	Thus, the passage defines a "scientific culture" in this context not merely as a tradition of inquiry, but as a technoscientific culture—one that is deeply mediated by instruments. From this perspective, mathematics is indeed only now developing a scientific culture in the instrumental sense because it is only recently becoming dependent on computational machinery. The statement in option 1, therefore, aligns with the passage's narrower definition of "scientific culture" as an instrumentally embodied practice. It does not contradict the passage; rather, it echoes the idea that mathematics is late in adopting the instrumental trappings that characterize modern technoscience.
13.	The paragraph follows a logical sequence: Introduces Denneny's focus on taste as a way to highlight a historical change. Describes that historical change—the expanded meaning of "taste" in the 17th–18th centuries. The missing sentence now clarifies the conceptual relationship between taste and judgment during that period, noting that while the terms were often used interchangeably, taste retained a connection to pleasure and embodiment that later theories of judgment lost—a link Arendt sought to restore. This elaboration fits naturally after the description of the historical shift and before the final sentence about recovering neglected thinkers. Concludes by noting that tracing this history helps recover overlooked thinkers. Placing the sentence at position 3 allows it to build on the historical context just provided and set up the final point about why this recovery matters. Inserting it earlier (position 1 or 2) would interrupt the flow from Denneny's focus to the historical explanation; placing it at the end (position 4) would disconnect it from the discussion of taste's historical meaning and make the reference to "thinkers at the time" less clear.
14.	The passage makes three central claims: Human-created landscapes (meadows, gardens, forests) have historically formed ecological "mosaics" that support diverse species. Research shows that human presence has often increased biodiversity (e.g., hay meadows preserved more species than meadows cultivated for biodiversity). Therefore, the old idea that humans are inherently antithetical to nature is wrong, and visions of thriving, human-free environments are often imaginary. Option 3 incorporates all these elements: it directly challenges the notion that humans always harm nature, cites historical evidence that human action has equally likely increased biodiversity, and mentions the creation of varied ecological landscapes that support many species. The other options are incomplete or slightly misrepresent the passage: Option 1 focuses only on the success of human-shaped landscapes in preserving species but omits the broader argument against the "humans as antithetical to nature" idea. Option 2 mentions that human action can assist preservation but lacks the historical context and the comparison with explicitly biodiversity-focused efforts. Option 4 is too narrow, anchoring the argument mainly in the early Holocene study and not fully capturing the passage's critique of the "human-free" ideal. Thus, option 3 provides the most comprehensive and accurate summary.
15.	The Irony: Elizabeth Magie, a left-wing feminist, created a game to critique capitalism (anti-capitalist message). The game was later co-opted, stripped of its message, and turned into a symbol of capitalist accumulation (Monopoly), while she was erased from its history. The Act of Plagiarism: While the passage doesn't use the word "plagiarised," it clearly states Darrow sold a simplified version of Magie's game and was credited as the sole inventor. This accurately describes an act of plagiarism—taking someone else's work and claiming it as one's own. The Financial Injustice: The passage highlights she received only $500 with no royalties, a "meagre sum" compared to the game's later success, which Darrow and Parker Brothers profited from. Option 4 directly captures the ironic reversal, the act of taking credit, and the unfair outcome that the passage emphasizes. It aligns with the passage's tone of revealing a hidden injustice. Therefore, Option 4 is the best summary.
16.	Sentence 1 introduces the concept of "literature on screen" as a dual-citizenship idea. Sentence 4 follows by revealing the deeper, contradictory assumption underlying adaptation studies: that adaptations are primarily studied within the context of literature. Sentence 2 provides evidence for this assumption by contrasting the wide range of source materials in film with academia's persistent focus on literature. Sentence 3 then offers an interpretation of why adaptation studies cling to literature: to borrow its cultural prestige while keeping adaptations subordinate. This order creates a logical flow from concept to underlying assumption, to illustrative evidence, and finally to critical analysis.

17.	The quoted statement explicitly argues that bridging arts and sciences produces "valuable knowledge" leading to a better understanding of the human condition. A direct and valid conclusion is that such interdisciplinary combination yields the most comprehensive understanding. Option 1 is vague and does not mention the arts–sciences bridge. Option 2 only mentions literary descriptions contributing to arts and sciences, reversing the direction of contribution. Option 3 inverts the logic, suggesting that studying the human condition helps us understand the arts and sciences, which is not what the statement says. Thus, option 4 correctly captures the intended conclusion: combining arts and sciences offers the best path to a full understanding of the human condition.
18.	The second paragraph argues that the emotional or spiritual component of a place is no less real than a surveyor's map, but it does not suggest that the emotional experience can replace the map. The passage consistently emphasizes that literary and scientific approaches are complementary and both are necessary for a complete understanding. Therefore, the claim that one can replace the other contradicts the paragraph's argument. The other options are supported by the paragraph: Option 1 reflects the statement that the emotional component is "no less 'real' than a surveyor's map." Option 3 aligns with the idea that literature provides the emotional component missing from scientific records. Option 4 corresponds to the sentence that "Histories of places live on in many forms, one of which is the human memory or imagination."
19.	In the fourth paragraph, the author gives the example of a literary description of place that includes "how people from different races or classes can experience the same place in different ways linked to those racial or class disparities." This directly illustrates literature's capacity to capture varied, subjective human experiences of a single location—highlighting its role in conveying social and perceptual diversity. Option 1 is incorrect; the passage does not mention architects calibrating noises and lights. Option 2, while true, is a separate example provided later in the same paragraph, not the primary illustration being asked about. Option 3 contradicts the passage's argument that literary and scientific approaches are both necessary and complementary. Thus, the author uses the example to show that literature can represent how different people experience the same place differently.
20.	The question asks which statement, if false, would not contradict the passage. If statement 1 is false, it means humans do interact with places in subjective, emotional ways. This aligns with the passage's argument that places have emotional/spiritual components and are not merely physical topography. Thus, its falsehood does not contradict the passage. The other options, if false, would contradict the passage: Option 2: If false, literature does not provide insights into movement/migration's effects on geography—contradicts the passage's claim that literature offers valuable perspectives on cultural geography. Option 3: If false, descriptions do need satellite imagery to give a "real" sense of place—contradicts the passage's argument that literary descriptions (using sensory language) can convey a real experience of place. Option 4: If false, vivid sensory writing cannot capture the multi-modal human experience of place—directly contradicts the passage's emphasis on sensory language as primary for knowing physical space. Hence, only option 1, when false, does not conflict with the passage's arguments.
21.	The author compares AI-generated texts to "a beige office building" to illustrate that they are bland, generic, safe, and inoffensive—qualities that help foster trust and appear professional. This comparison is directly linked to the AI's tone (polite, collegial) and its generic, non-specific output, which correspond to options 1, 3, and 4. However, option 2 describes how AI responds when criticized for biases—a defensive explanation that is separate from the characteristics of its everyday textual output. While the passage mentions that ChatGPT blames training data for biases, this is not a reason for the "beige office building" comparison; it is a separate observation about accountability. Therefore, option 2 is not a reason for the simile.
22.	The other examples (options 2, 3, and 4) are all specific instances where AI outputs demonstrate bias or inaccuracy: Option 2: ChatGPT edits the author's text to be more favorable toward big tech. Option 3: Bing Image Creator produces a gender-biased image (all-male engineers/explorers). Option 4: ChatGPT replaces Indian English with American English, showing cultural bias. These are concrete illustrations of the problems the passage highlights—AI reinforcing stereotypes, cultural norms, or influencing users.

	Option 1, however, is not an example of a biased or inaccurate output. Instead, it is ChatGPT's self-description of its communication strategy—an explanation of how it aims to build trust. This serves to reveal the design intent behind the "collegial neutrality" that the author critiques, rather than exemplify a harmful outcome. Thus, in terms of purpose, option 1 is the odd one out.
23.	The question asks which statement does NOT affirm the gap between tech companies' claims about AI and AI's actual behavior. Option 1: Directly highlights the disjunct. AI claims a "collegial neutrality," but this veneer can "lull us into absorbing false or biased responses." This affirms the gap. Option 2: Does NOT affirm the disjunct. It expresses the author's personal uncertainty and lack of confirming research about a perceived bias. It does not state that a gap between claim and reality has been verified. It is a statement of speculation, not evidence. Option 3: This statement is about the user's role and complicity, not about a specific AI claim or its performance. While it describes a dynamic of exploitation, it doesn't directly address the disjunct between a specific claim made by a tech company and an AI's actual output. It is more about the human-complicity framework than the claim/reality gap, which makes it a weaker candidate than Option 2. Option 4: Provides clear evidence of gender bias, directly contradicting claims of neutrality and objectivity. This affirms the disjunct. Therefore, Option 2 is the correct answer as it is the only one that explicitly refrains from affirming the disjunct due to a lack of confirmed evidence. My initial selection of Option 3 was incorrect. Thank you for the correction.
24.	The passage explicitly argues that AI's "veneer of collegial neutrality" actually lulls users into absorbing false or biased responses without much critical engagement. This directly contradicts the idea that AI's neutrality promotes critical thinking. The other claims align with the author's views: Option 1 reflects the author's core argument about complicity. Option 3 is supported by the passage's discussion of economic motives behind building trust. Option 4 is treated as a plausible observation (though the author notes a lack of definitive research). Thus, the author would strongly disagree with the claim that AI's neutrality fosters critical thinking.
25 - 29.	Ananya Raga, Bhaskar Tala, Charu Veena, and Devendra Sur are musicians. Let us denote them by A, B, C and D Respectively. Each of them started and completed their training as students under each of three Gurus — Pandit Meghnath, Ustad Samiran, and Acharya Raghunath between 2013 and 2024. Let us denote them by PM, US and AR respectively. When two students train under the same Guru at the same time, they are referred to as Gurubhai and from point 1 "Ustad Samiran never trained more than one of these students in the same year." it means guru bhai are possible under training of PM and AR Only. Now possible pair of gurubhai are AB, AC, AD, BC, BD and CD and from point 3, AD and BC are nevergurubhai.so possible combination of gurubhai are AB, AC ,B D and CD Now Each Guru trains any student for consecutive years only, for a span of 2, 3, or 4 years, with each Guru having a different span and also it is given that Acharya Raghunath did not train any of these students during 2015-2018, as well as during 2021-24. So possible training years for AR are 2013-14 and 2019-20. So his training span is 2 years So span for PM and US are 3 or 4 years in any order Now from point 4 In 2013, Ananya and Bhaskar started their trainings under Pandit Meghnath and under Ustad Samiran, respectively. So in 2013-14 the C and D are gurubhai under AR Also All other pairs except AD and BC of musicians were Gurubhai for exactly 2 years. IN 2013 A is under PM and CD are occupied with AR so A alone under PM for 2013-14 and with someone else for 2014-15 and hence span for PM is 4 years and for US is 3 years. Now in 2014 -15 the C and D are free as B wound be with US till 2015 also AD is not possible pair. So AC are gurubhai under PM for 2015-16. So after B, D will be under US from 2016-2018. Now under PM, C will be alone for 2017-18 and with D in 2019 -20. Also AB will with AR in 2019-20.keeping all constraint and to have no clash so that all may get trained under each guru and fulfilling gurubhai possible pair we get the following arrangement:

GURU / YEAR	Acharya Raghunath (AR)	Ustad Samiran (US)	Pandit Meghnath (PM)
2013	C,D	B	A
2014	C,D	B	A
2015	X	B	A,C
2016	X	D	A,C
2017	X	D	C
2018	X	D	C
2019	A,B	C	D
2020	A,B	C	D
2021	X	C	D,B
2022	X	A	D,B
2023	X	A	B
2024	X	A	B

25. As shown among given options 2020 is the answer

26. As shown Charu begin her training under Pandit Meghnath in 2015.

27. As shown Bhaskar and Devendra were Gurubhai in 2022

28. As shown option 2 is true.

29. He years are 2017,2018,2023 and 2024

30 - 33. As given in Point 1 In 2016, B, C, E, and A, had ranks 1, 2, 3, and 4 respectively. graph first we can find the values for E and in point 2 F had lower SI than any other country in 2016, 2020, and 2024.means D is rank 5 in 2026 and F is rank 6 in 2016 . Also F is ranked 6 in year 2020 and 2024
So we get the following table:

Rank / year	1	2	3	4	5	6
2016	B	C	E	A	D	F
2020						F
2024						F

Now from point 4 it is given, E was the only country with SI of 90.also
Y-coordinate representing % increase in 2024 from 2020which is 20 % for E 1.2 of SI of E of 2020 = 90
So SI of E of 2020 = 90/1.2 = 75

X-coordinate representing % increase in 2020 from 2016,which is 25% for E
1.25 of SI of E of 2024 = 75
So SI of E of 2024 = 75/1.25 = 60

Now we get the following table:

Rank 2016	1	2	3	4	5	6
Country / SI in 2016	B	C	E (60)	A	D	F
Rank 2020	---	---	---	---	-	6
Country / SI in 2020	B	C	E(75)	A	D	F
Rank 2024	---	---	---	---	-	6
Country / SI in 2024	B	C	E(90)	A	D	F

Now The range of SI of the six countries was 60 in 2016 as well as in 2024.
So in 2024 the Si for F is 30(As for more than 90 for any other contradicts integral condition) and taking % changes from X and y Axis as done For E we get the value of SI for F as 40 and 20 for year 2020 and 2016 respectively.

Also range for 2016 is 60 so value of Si of B for 2016 is 20 +60 = 80 and taking % from X and Y axis the value of Si for B are 60 and 45 for year 2020 and 2024 respectively

<table>
<tr><td></td><td>Further one question requires value for C we can see Y-coordinate representing % increase in 2024 from 2020 which is 40 % for C So IT IS 1.4 of value of SI of C for 2020 and keeping condition of ranking of 2016 and integral condition only value that fits for SI of C for 2024 is 84

So we get the following table:

<table>
<tr><td>Rank 2016</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr>
<tr><td>Country / SI in 2016</td><td>B (80)</td><td>C</td><td>E (60)</td><td>A</td><td>D</td><td>F(20)</td></tr>
<tr><td>Rank 2020</td><td>---</td><td>---</td><td>---</td><td>---</td><td>-</td><td>6</td></tr>
<tr><td>Country / SI in 2020</td><td>B(60)</td><td>C</td><td>E(75)</td><td>A</td><td>D</td><td>F (40)</td></tr>
<tr><td>Rank 2024</td><td>---</td><td>---</td><td>---</td><td>---</td><td>-</td><td>6</td></tr>
<tr><td>Country / SI in 2024</td><td>B (45)</td><td>C</td><td>E(90)</td><td>A</td><td>D</td><td>F (30)</td></tr>
</table>
</td></tr>
<tr><td>30.</td><td>As shown SI of E in 2016 is 60</td></tr>
<tr><td>31.</td><td>As shown SI of F in 2020is 40</td></tr>
<tr><td>32.</td><td>For calculating the SI of C in 2024
we can see Y-coordinate representing % increase in 2024 from 2020 which is 40 % for C So IT IS 1.4 of value of SI of C for 2020 and keeping condition of ranking of 2016 and integral condition only value that fits for SI of C for 2024 is 84</td></tr>
<tr><td>33.</td><td>As shown ,was the SI of B in 2024</td></tr>
<tr><td>34 - 38.</td><td>Let the NUR of Whimshire, Fogglia, and Humbleset are W, F and H respectively.
Given that, there is only one pair of an NUR and a city (considering all cities and all NURs) where the PM of the NUR is greater than that of the city and that NUR and the city both belong to Humbleset.
Also, Humbleset and Fogglia having the highest and the lowest PI respectively, we get the following:
The nine PMs to be assigned to the six cities : Blusterburg, Noodleton, Splutterville, Quackford, Mumpypore, Zingaloo and three NUR : W, F and H are 10, 20, 30, 40, 50, 60, 70, 80, 90, where 10,20,30,40 are to be assigned to W,F,H and Blusterburg……(i)
Blusterburg , Zingaloo and the NUR with PMs = 40 are in Humbleset….(ii)
So, PMs of H = 40…..(iii)
PMs of Blusterburg = 30….(iv)
PMs of W and F are 20 and 10 respectively….(v)
The remaining PMs are 50, 60, 70, 80, 90. Given that the six cities in increasing order of their PMs are: Blusterburg, Noodleton, Splutterville, Quackford, Mumpypore, Zingaloo, we get their PMs as follows:
PMs of Blusterburg = 30. (From (iv))
PMs of Noodleton = 50.
PMs of Splutterville = 60.
PMs of Quackford = 70.
PMs of Mumpypore = 80.
PMs of Zingaloo = 90.
Since the PIs of all three states are distinct integers, with Humbleset and Fogglia having the highest and the lowest PI respectively, so the sum of the PMs of the two cities in a state is a multiple of 4. So we get:
Splutterville with PMs = 60 and Mumpypore with PMs = 80 are in Whimshire.
andNoodleton with PMs = 50 and Quackford with PMs = 70 are in Fogglia.
From (v): PMs of W and F are 20 and 10 respectively. So,
PI of Whimshire = ½ (20) + ¼ (60 + 80) = 45.
PI of Fogglia = ½ (10) + ¼ (50 + 70) = 35.
PI of Humbleset = ½ (40) + ¼ (30 + 90) = 50….(using (ii))</td></tr>
<tr><td>34.</td><td>PI of Whimshire = 45.</td></tr>
<tr><td>35.</td><td>PI of Fogglia = 35.</td></tr>
<tr><td>36.</td><td>PI of Humbleset = 50.</td></tr>
<tr><td>37.</td><td>Noodleton with PMs = 50 and Quackford with PMs = 70 are in Fogglia.</td></tr>
<tr><td>38.</td><td>For all the cities and NURs we are able to identify their PM and the state they belong to.</td></tr>
<tr><td>39 - 42.</td><td>First we write the information from graphs in following tables:

<table>
<tr><td>Author</td><td>Total Papers</td></tr>
<tr><td>A</td><td>5</td></tr>
<tr><td>B</td><td>8</td></tr>
<tr><td>C</td><td>12</td></tr>
<tr><td>D</td><td>10</td></tr>
</table>
</td></tr>
</table>

Type of Article	No. of Articles
Single-author	10
Two-author	4
Three-author	3
Four-author	2

From Table 2: Four author articles = 2 (as there are only four authors so that means every author wrote 2 four author articles.)
Point 1: Every author wrote at least 1.
So, A who wrote 5 articles must have 1 (single) + 1 (two) + 1 (three) + 2 (four) making total 5

Point 3 : C and D wrote more articles than B.
As three author articles are only 3 in number so,
So only logical option for 3 author article is C, D = 3 and B = 2.

So till now we get the following table :

	Single Authored	Two authored	Three	Four Authored
A	1	1	1	2
B	2	2	2	2
C				2
D				2

Point 2 : all author wrote different no of single articles that means
1 + 2 + 3 + 4 = 10. So 1, 2, 3 and 4 articles as till now 1 and 2 are for A and B res. 3 and 4 in this category for C and can be in any order making following two final possibilities:

Case 1:

	Single Authored	Two authored	Three	Four Authored
A	1	1	1	2
B	2	2	2	2
C	3	4	3	2
D	4	1	3	2

Case 2 :

	Single Authored	Two authored	Three	Four Authored
A	1	1	1	2
B	2	2	2	2
C	4	3	3	2
D	3	2	3	2

39. the total number of two-author and three-author papers written by Brajen = 2 + 2 =4

40. As shown neither of statement is necessarily true

41. Three authored papers are A C D, B C D & B C D
So both I and II are necessarily true

42. This is true for case 1. Hence 3

43 - 46. Representing, the ball passes through the hoop and makes a "ping" by: √
Representing, the ball gets stuck on the hoop and does not make a ping by: ×

Using the given additional information in the question we get the following table:

	B1	B2	B3	B4	B5	B6
H1	√	√	×	√	√	√
H2	×	√	×	×	×	×
H3	×			√		
H4	√				×	√

The given statement (3) $\Rightarrow B_3$ has the largest diameter ….(A)
The given statement (4) $\Rightarrow B_2$ has the smallest diameter ….(B)
Since each row has at least one '×' so there is always a ball which gets stuck on the hoops and hence B_3 is stuck on all the hoops. [By using (A)]
Similarly, since each row has at least one '√' so there is always a ball which passes through the hoops and hence B_2 passes through all the hoops. [By using (B)]

So we get the following table:

	B_1	B_2	B_3	B_4	B_5	B_6
H1	√	√	×	√	√	√
H2	×	√	×	×	×	×
H3	×	√	×	√		
H4	√	√	×		×	√

On H_3, B_4 marks a ping and B_1 does not $\Rightarrow B_1$ has a larger diameter than B_4.
$\Rightarrow B_1 > B_4$…… (C)
On H_4, B_1, B_6 make a ping but B_5 does not $\Rightarrow B_5$ has a larger diameter than B_1 and B_6.
$\Rightarrow B_5 > B_1$ and $B_5 > B_6$ …… (D)
$\Rightarrow B_5 > B_1 > B_4$ and $B_5 > B_6$ [Using (C) & (D)]
$\Rightarrow B_3 > B_5 > B_1 > B_4 > B_2$ and $B_5 > B_6$…… (E)
On H_4, B_1 makes a ping and $B_1 > B_4$ so B_4 will also make a ping.
On H_3, B_1 does not make a ping and $B_5 > B_1$ so B_5 also will not make a ping.

So we get the following table:

	B_1	B_2	B_3	B_4	B_5	B_6
H_1	√	√	×	√	√	√
H_2	×	√	×	×	×	×
H_3	×	√	×	√	×	√ or ×
H_4	√	√	×	√	×	√

Number of pings on $H_1 = 5$
Number of pings on $H_2 = 1$
Number of pings on $H_3 = 2$ or 3
Number of pings on $H_4 = 4$

So comparing the diameters of hoops:
$H_1 > H_4 > H_3 > H_2$…… (F)
Number of pings by the balls: $B_1 = 2$, $B_2 = 4$, $B_3 = 0$, $B_4 = 3$, $B_5 = 1$ and $B_6 = 2$ or 3…….. (G)

43. 2 + 4 + 0 = 6 (By using (G))

44. $B_3 > B_5 > B_1 > B_4 > B_2$ and $B_5 > B_6$ (By using (E))
$\Rightarrow B_2 < B_1 < B_5$ is true
$B_4 < B_5 < B_3$ is true
$B_1 < B_5 < B_3$ is true
But $B_1 < B_6 < B_3$ is not necessarily true.

45. $H_1 > H_4 > H_3 > H_2$ (By using (F))

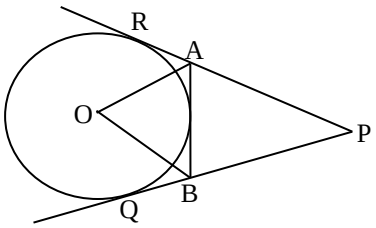
46. 2 + 4 + 0+ 3 + 1 + 2 = 12
or
2 + 4 + 0 + 3 + 1 + 3 = 13
(By using (G))

47. Let the common root be α. Call the other roots β for $3x^2 - 5x + p = 0$ and γ for $2x^2 - 2x + q = 0$.
- $\alpha + \beta = 5/3$ (since sum of roots of $3x^2 - 5x + p = 0$ is 5/3),
- $\alpha + \gamma = 1$ (since sum of roots of $2x^2 - 2x + q = 0$ is 1).

So the sum of the other roots is
$\beta + \gamma = (5/3 - \alpha) + (1 - \alpha) = 8/3 - 2\alpha$.
Multiply the first by 2 and the second by 3:
$6\alpha^2 - 10\alpha + 2p = 0$, $6\alpha^2 - 6\alpha + 3q = 0$.
Subtracting gives $-4\alpha + 2p - 3q = 0$, so $\alpha = (2p - 3q)/4$.

	Hence $\beta + \gamma = 8/3 - 2\cdot[(2p - 3q)/4] = 8/3 - p + 3/2q$.
48.	Take the regular hexagon ABCDEF with side length 'S'. Recall two standard facts about a regular hexagon: • It can be split into 6 congruent equilateral triangles by joining the center O to the vertices; call the area of one such equilateral triangle T. Thus $T = \sqrt{3}/4S^2$, $A_{hex} = 6T = 3\sqrt{3}/2S^2$. • Opposite sides of the hexagon are parallel and the figure has the usual 60°/120° symmetry axes. The line PQ is parallel to BC and finds the perpendicular distance (height) between them. By symmetry of the regular hexagon the midpoints P of AB and Q of CD lie on a line which is parallel to the side BC; moreover this line is halfway (perpendicularly) between the line through BC and the centre O. The altitude of one of the equilateral center-triangles (for example triangle OBC) is $\sqrt{3}/2S$; half of that altitude is $h = 1/2\cdot\sqrt{3}/2S = \sqrt{3}/4S$, and this is exactly the perpendicular distance between the parallel lines BC and PQ. The lengths of the two parallel sides of the trapezium PBCQ. The top base is BC = S. The bottom base PQ equals 1/2AB+BC+1/2C when taken as the projection along the direction parallel to BC (intuitively: from midpoint of AB to midpoint of CD you cross half of AB, the full side BC, and half of CD); hence $PQ = S/2 + S + S/2 = 3S/2$ Area of trapezium PBCQ. $APBCQ=1/2(PQ+BC)\cdot h =1/2(3S/2 + s)\cdot \sqrt{3}/4S = 1/2\cdot5S/2\cdot\sqrt{3}/4S=5\sqrt{3}/16S^2$. Ratio to the whole hexagon. The whole hexagon area is $A_{hex} = 3\sqrt{3}/2S^2$. Therefore $APBCQ / A_{hex} = (5\sqrt{3}/16S^2)/(3\sqrt{3}/2S^2) =5/24$.
49.	$\log_{64}x^2 + \log_8 y + 3\log_{512}(z\sqrt{y}) = 4$. Convert all logs to base 2 (since $64 = 2^6$, $8 = 2^3$, $512 = 2^9$): $\log_{64}x^2 = (2\log_2 x)/6 =1/3\log_2 x$,$\log_8\sqrt{y} = ½(\log_2 y)/3 = 1/6\log_2 y$, and $3\log_{512}(z\sqrt{y}) = 3\cdot\log_2(z\sqrt{y})/9 =1/3(\log_2 z + 1/2\log_2 y) = 1/3\log_2 z + 1/6\log_2 y$ Adding the three pieces gives $1/3\log_2 x + 1/6\log_2 y + (1/3\log_2 z + 1/6\log_2 y) = 1/3(\log_2 x + \log_2 y + \log_2 z) = 4$. So, $\log_2(xyz) =12 \Longrightarrow xyz =2^{12}$. By AM – GM for positive x, y, z $x + y + z \geq 3(xyz)^{1/3} = 3\cdot2^4 = 48$,with equality when x = y = z = 16. Hence the minimum possible value of x + y + z is 48.
50.	Case 1: $x + 9 \geq 0$ (i.e. $x \geq -9$) Then $\lvert x + 9\rvert = x + 9$. The inequality becomes: $x^2 - (x + 9) + x > 0$ Simplify: $x^2 - 9 > 0$ $(x - 3)(x + 3) > 0$ This is positive when: $x < -3$or $x > 3$ But in this case we also need $x \geq -9x$. Combining: • $x < -3$ and $x \geq -9$ gives: $(-9,-3)$ • $x > 3$ unchanged gives: $(3,\infty)$ So case 1 produces: $(-9, -3)\cup(3, \infty)$ Case 2: $x + 9 < 0$ (i.e. $x < -9$) Then $\lvert x + 9\rvert = -(x + 9)$. The inequality becomes: $x^2 - (-(x+9)) + x > 0$ This quadratic has discriminant: $\Delta = 4 - 36 = -32 < 0$ So it is always positive for all real x Thus every $x < -9$ Case 2 gives: $(-\infty,-9)$

	(combine both cases) $(-\infty,-9) \cup (-9,-3) \cup (3,\infty)$ Notice that $(-9, -3)$ = the missing piece that joins $(-\infty, -9)$ through -3 Thus the full solution is: $(-\infty, -3) \cup (3, \infty)$
51.	Let the total amount be 100 units Pinu receives 20% of total: P = 20 Remaining: 100 - 20 = 80 Meena receives 40% of the remaining: M = 40% × 80 = 32 Remaining: 80 − 32 = 48 Seema receives 20% less than Pinu: S = P − 20% P = 20 − 4 =16 Remaining (this must be Rinu's amount): R= 48 − 16 = 32 Required Ratio (Pinu : Rinu) P : R = 20 : 32 = 5 :8
52.	Let Chandan's efficiency be x (job/day). Then Bipin = 2x, Ankita = 4x. Work done in first 20 days (all three working): 20(4x + 2x + x) = 20·7x =140x. After Bipin leaves, Ankita and Chandan work for the remaining 60 − 20 = 40days 40(4x + x) = 40·5x = 200x. Total work =140x + 200x = 340x which equals 1 job, so x = 1/340. Time for Chandan alone =1/x = 340 days.
53.	Let the first term be a and common ratio r with $0 < r < 1$ (decreasing infinite GP). Then $a_1 + a_2 + a_3 = a + ar + ar^2 = a(1 + r + r^2) = 52$, and $a_1a_2 + a_2a_3 + a_3a_1 = a\cdot ar + ar\cdot ar^2 + ar^2\cdot a = a^2(r + r^2 + r^3) = 624$. Note $r + r^2 + r^3 = r(1 + r + r^2)$. From the two equations $a(1 + r + r^2) = 52$, $a^2(r(1 + r + r^2)) = 624$, divide the second by the square of the first (or simply observe) ra = 624/52 ⇒ a = 12/r. Substitute into $1 + r + r^2 = 52/a = 52r/12 = 13r/3$ $1 + r + r^2 = 13r/3 \Longrightarrow 3r^2 - 10r + 3 = 0$. Solve: r = (10 ± 8)/6r so, r = 3 or r = 1/3r. Since the progression is decreasing we take r = 1/3. Then, a = 12/r = 36. The sum of the infinite GP is a/(1 − r) = 36/(1 − 1/3) = 36/(2/3) = 54.
54.	Basic restrictions from f and g For f(x) = x/(2x − 1): Denominator cannot be zero: 2x − 1 = 0 ⇒ x = 1/2. For g(x) = x/(x−1): Denominator cannot be zero: x − 1 = 0 ⇒ x = 1 So far forbidden values: x = 1/2, 1. Restrictions from f(g(x)) We need g(x) ≠ 1/2, because f(y) is undefined at y = 1/2. Solve: g(x) = x/(x − 1) = 1/2 Cross multiply: 2x = x−1 So x = −1 is NOT allowed. Also must ensure g(x) ≠ 1/2: done.

	Restrictions from g(f(x)) We need $f(x) \neq 1$, because g(y) is undefined at y = 1. Solve: $f(x) = x/(2x-1) = 1$ $x = 2x - 1$ x = 1 was already excluded. FINAL DOMAIN RESTRICTIONS Forbidden values are: $-1,\ 1/2,\ 1$
55.	Let the annual interest rate be r%. Grow the loan to the end of Year 1 Loan at start: 1000 After 1 year at interest r%, it becomes: $1000(1 + r)$ You pay Rs 530 at the end of Year 1, so remaining amount is: $1000(1 + r) - 530$ Grow this remaining balance to the end of Year 2 Remaining amount at end of Year 1: $1000(1 + r) - 530$ After 1 more year: $(1000(1 + r) - 530)(1 + r)$ At end of Year 2, you pay Rs 594 which fully clears the loan: $(1000(1 + r) - 530)(1 + r) = 594$ Expand $1000(1 + r)^2 - 530(1 + r) = 594$ Try the given options instead of solving. Try r = 8% ⇒ 1 + r = 1.08 Left side: $1000(1.08)^2 - 530(1.08) = 1000(1.1664) - 572.4$ $= 1000(1.1664) - 572.4 = 1166.4 - 572.4 = 594$ So r = 8%
56.	The three lines PQ, PR, and AB are all tangents to the same circle, so they form a triangle PAB for which the given circle is the incircle. Hence the centre O of the circle is the incenter of triangle PAB. A standard incenter fact: for any triangle the angle at the incenter between the rays to two vertices equals $90^\circ - 1/2$ of the angle at the third vertex. Applied to triangle PAB this gives $\angle AOB = 90^\circ - 1/2\ \angle APB$. Given $\angle AOB = 50^\circ$ we get $50^\circ = 90^\circ - 1/2\ \angle APB$ $\Longrightarrow 1/2\angle APB = 40^\circ$, so $\angle APB = 80^\circ$. 
57.	Let coffee price = C (Rs/kg) and cocoa price = K (Rs/kg). From the two given mixtures: $0.16C + 0.84K = 240,\ 0.36C + 0.64K = 320.$ Subtract the first from the second: $0.20C - 0.20K = 80 \Longrightarrow C - K = 400$ Substitute C = K + 400 into the first: $0.16(K + 400) + 0.84K = 240 \Longrightarrow K + 64 = 240 \Longrightarrow K = 176,$ so C = 576 For the new mixture costing 376 per kg with coffee fraction f: $f \cdot 576 + (1 - f) \cdot 176 = 376 \Longrightarrow 400f = 200 \Longrightarrow f = 0.5.$ So the new mixture is 50% coffee. In 10 kg there are $0.5 \times 10 = 5$ kg of coffee.
58.	Given a + b + c + d = 46 with integers a, b, c, d. We minimize $S = (a - b)^2 + (a - c)^2 + (a - d)^2$ by keeping the values as close to each other as possible. If all four were equal then $4a = 46 \Rightarrow a = 11.5$ not integer, so perfect equality impossible. The closest integer distribution: 12, 12, 11, 11 (sum = 46). Take a = 12, b = 12, c = 11, d = 11 ⇒ $S = (12 - 12)^2 + (12 - 11)^2 + (12 - 11)^2 = 0 + 1 + 1 = 2$. S cannot be 0 or 1 because that would require all four equal or three equal and one off by 1, both

	impossible with sum 46. Therefore, the minimum possible value is 2.
59.	Total copies sold in initial 7 days = 60 × 7 = 420 Total copies sold in initial 8 days = 63 × 8 = 504 Copies sold on 8th day = 84 Copies sold on 9th day = 73 Total copies sold from the 2nd to the 9th day = 8 × 66 = 528 Copies sold on 1st day = Total Copies sold in 9 days - Total Copies sold in last 8 days = 577 - 528 = 49
60.	Let y = 3^(x^2 + 2x − 2). Then 9^(x^2 + 2x − 3) = 3^(2(x^2 + 2x − 3)) = (1/9)·3^(2(x^2 + 2x − 2)) = (1/9)y^2. Equation becomes: (1/9)y^2 − 4y + 27 = 0 ⇒ y^2 − 36y + 243 = 0 ⇒ y = 27 or 9. If y = 27: 3^(x^2 + 2x − 2) = 3^3 ⇒ x^2 + 2x − 5 = 0 ⇒ Product of roots = −5. If y = 9: 3^(x^2 + 2x − 2) = 3^2 ⇒ x^2 + 2x − 4 = 0 ⇒ Product of roots = −4. Product of all possible x values = (−5)(−4) = 20. Final Answer = 20.
61.	Given distinct natural numbers a,b,c with 3ac = 8(a + b). Rearrange: 3ac−8a = 8b ⇒ a(3c−8) = 8b ⇒ b = a(3c−8)/8, so b must be a positive integer and a,b,c are distinct. Test smallest natural a to minimize 3a+2b+c: For a = 1 ⇒ (3c−8) must be multiple of 8 ⇒ smallest c = 8 ⇒ b=2 ⇒ (a, b, c) = (1, 2, 8) gives 3a + 2b + c = 3 + 4 + 8 = 15. For a = 2 ⇒ (3c−8) must be multiple of 4 ⇒ smallest c = 4 ⇒ b = 1 ⇒ (a, b, c) = (2, 1, 4) gives 3a + 2b + c = 6 + 2 + 4 = 12. Check a = 3 ⇒ 3c − 8 must be multiple of 8 ⇒ smallest valid c gives larger results. Therefore smallest possible value of 3a + 2b + c is **12** (at a = 2 ,b = 1, c = 4).
62.	Place A = (0,0), C = (1,0), B = (0,1). Let D on BC : D = B + s(C − B) = (s, 1 − s), so BD : DC = s : (1−s). Let E on AC : E = (t, 0). T is on AD with AT : TD = 3:1 ⇒ T = A + (3/4)(D − A) = (3s/4, 3(1 − s)/4). T is on BE with BT : TE = 4:1 ⇒ T = B + (4/5)(E − B) = (4t/5, 1/5). Equate y-coordinates: 3(1−s)/4 = 1/5 ⇒ 15(1−s) = 4 ⇒ s = 11/15. Hence BD:DC = s:(1−s) = 11/15 : 4/15 = 11:4.
63.	Divisors are of the form 2^a · 3^b · 5^c · 7^e. Given 3^b ≡ 0 (mod 3) for any b ≥ 1, such divisors cannot be ≡ 1 (mod 3), so b = 0. Now 2 ≡ −1 (mod 3), 5 ≡ −1 (mod 3), 7 ≡ 1 (mod 3). Thus, divisor d ≡ (−1)^(a+c) (mod 3). For d ≡ 1 (mod 3), we need a + c even. Exponent ranges: a = 0..6 (7 choices), c = 0..3 (4 choices), e = 0..2 (3 choices). Total (a,c) pairs = 28; exactly half have a+c even ⇒ 14. Multiply by 3 values of e ⇒ 14 × 3 = 42. Final Answer = 42.
64.	Let River speed = v km/hr. For Sneha (speed 6 km/h): 14/(6−v) − 14/(6+v) = 48 min = 0.8 h. Compute: 14·[2v]/(36−v^2) = 0.8 ⇒ 28v = 0.8 x 36 - 0.8 v^2 ⇒ 7v = 0.2 x 36 - 0.2 v^2 ⇒ 2v^2 + 70v -72 = 0 ⇒ v^2 + 35v -36 = 0 ⇒ (v+36) (v-1) = 0 ⇒ v = -36, 1 Speed can't be negative. So River speed(v) = 1 km/hr Rita's still-water speed = 5 km/h Upstream Speed = 5−1 = 4 km/h, Downstream Speed = 5 + 1 = 6 km/h. If she goes x km upstream and returns x km downstream, total time = x/4 + x/6 = x(5/12) hours.

	Given total time = 100 min = 100/60 = 5/3 h. So x(5/12) = 5/3 ⇒ x = 4 km. Total distance = 2x = 8 km. Final Answer = 8 km.
65.	CP = 1650 Profit = 20% SP = 1650 * 1.20 = 1980 Let MP = M and original discount = r M - r = 1980 ……..…..(1) When discount is doubled: New SP = 1650 + 110 = 1760 M - 2r = 1760 ……....(2) By solving (1) and (2): ⇒ M = 2200 Required discount % = profit% Let x be new required SP profit% = discount % [(2200-x)/2200] * 100 = [(x-1650)/1650] * 100 ⇒ x = 1885 Now Discount % = [(2200-1885)/2200] * 100 Nearest percentage = 14%
66.	(625)^65 = (5^4)^65 = 5^260. (128)^36 = (2^7)^36 = 2^252. Product = 2^252 × 5^260 = 2^252 × 5^252 × 5^8 = 10^252 × 5^8 = 390625 × 10^252. So the number is 390625 followed by 252 zeros. Sum of digits = 3 + 9 + 0 + 6 + 2 + 5 = 25. Final Answer = **25**.
67.	Let expenditures be EL : EM = 2:3 ⇒ EL = 2x, EM = 3x. Given IL : EM = 6:7 ⇒ IL = 6y, EM = 7y ⇒ 3x = 7y ⇒ x = (7/3)y. So EL = 2x = 2·(7/3)y = (14/3)y. Savings: SL = IL − EL = 6y − (14/3)y = (4/3)y. Let IM be Meenakshi's income. SM = IM − EM = IM − 7y. Given SL : SM = 4 : 9 ⇒ (4/3)y : (IM − 7y) = 4 : 9 ⇒ 9·(4/3)y = 4(IM − 7y) ⇒ 12y = 4IM − 28y ⇒ 4IM = 40y ⇒ IM = 10y. Thus incomes IL: IM = 6y : 10y = 3 : 5. Final answer = 3:5.
68.	Let x = m + 2n and y = 2m + n, so xy = 27. Solve: 3m = 2y − x and 3n = 2x−y ⇒ m = (2y−x)/3, n = (2x−y)/3. Therefore, m, n are integers only if 2y−x and 2x−y are multiples of 3. Check integer factor pairs of xy = 27: (3, 9), (9, 3), (-3, -9), (-9, -3) give integer m, n. Compute 2m −3 n: (3, 9) →13; (9, 3) → −17; (-3,-9) → −13; (-9,-3) →17. Thus, the maximum possible value of 2m−3n is **17** (when m =1, n = -5).